

# IOWATER

Volunteer Water Quality Monitoring

## Photographic Benthic Macroinvertebrate Identification Guide

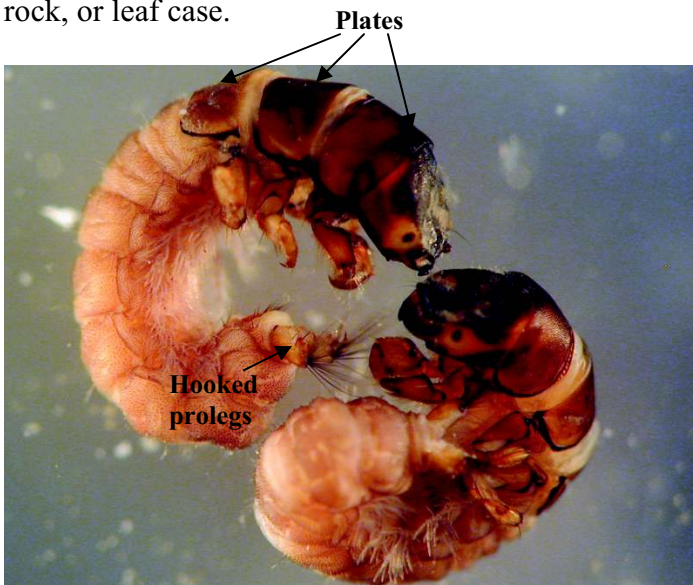


Jacklyn Gautsch

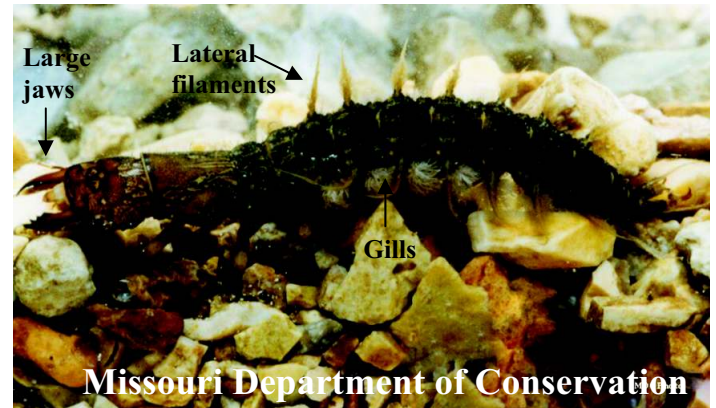


### **Pollution Intolerant**

**Caddisflies** – Have 3 pairs of legs each terminating in a pair of hooks. Head and thoracic segments (sometimes only the 1<sup>st</sup> segment) covered in hard plates and a soft abdomen that ends in a pair of prolegs bearing hooks. Sometimes builds a stick, rock, or leaf case.



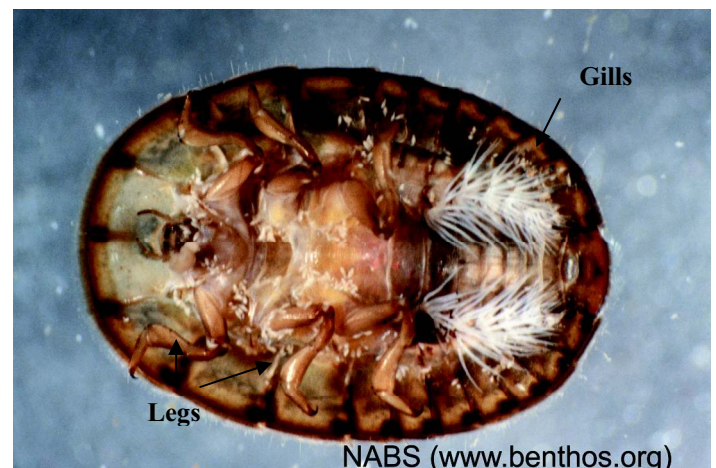
**Dobsonflies** – Have 3 pairs of legs, 8 pairs of lateral filaments on abdomen, and large forward projecting jaws. The end of the abdomen has a final set of lateral filaments and a pair of fleshy appendages bearing a pair of hooks.



**Right spiral snail** – Their opening spirals up from the right if you look at the shell with the tip pointed away from you. Do not count empty shells.



**Water Penny Beetles** – Are flat and saucer-shaped. They have 3 pairs of tiny legs and gills on the underside of their bodies.



### **NOTES:**

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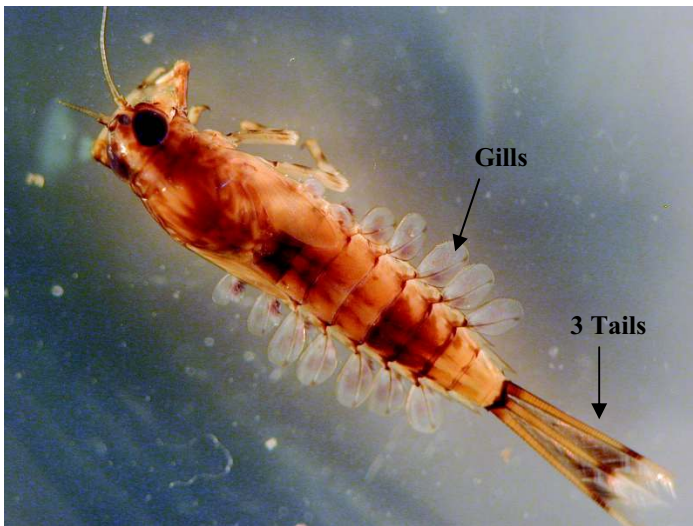
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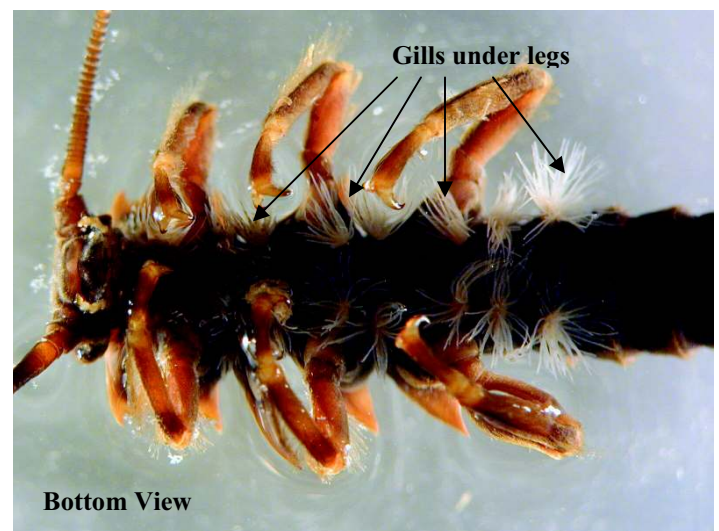
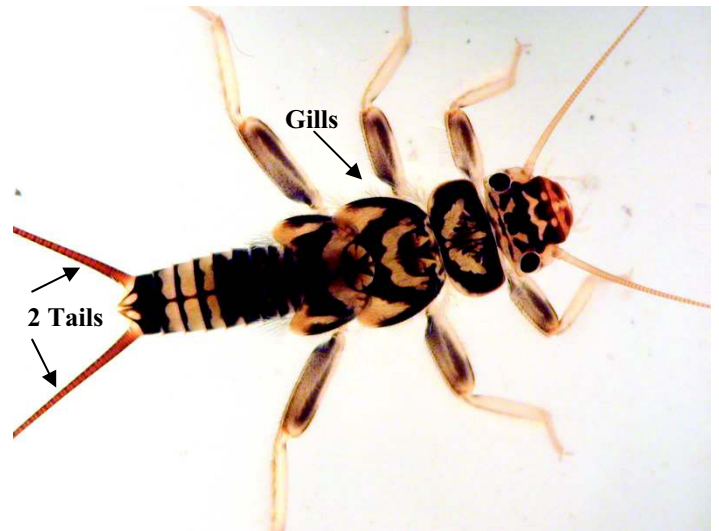
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**Mayflies** – Have 3 pairs of legs, feather or oval-shaped gills on their abdomen (lower body), and 2 to 3 long tails.

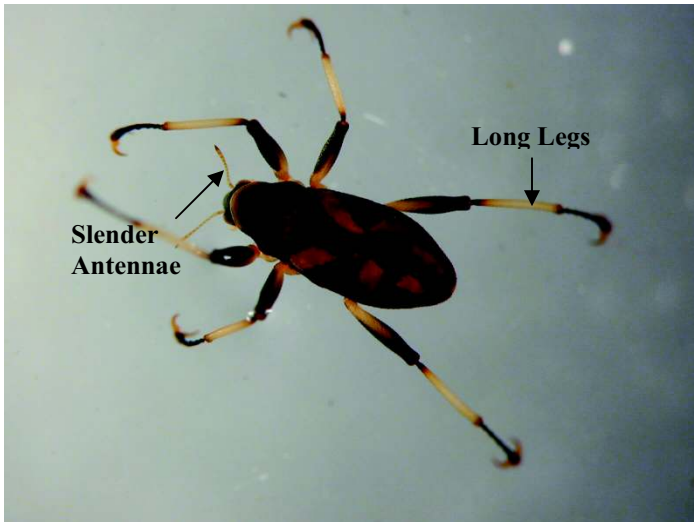


**Stoneflies** – Have 3 pairs of hooked legs, antennae, 2 tails and gill tufts under their legs (hairy armpits) or no visible gills.

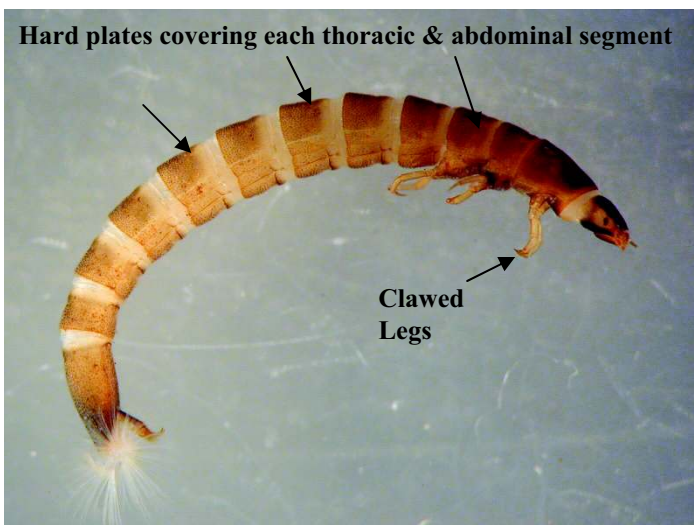
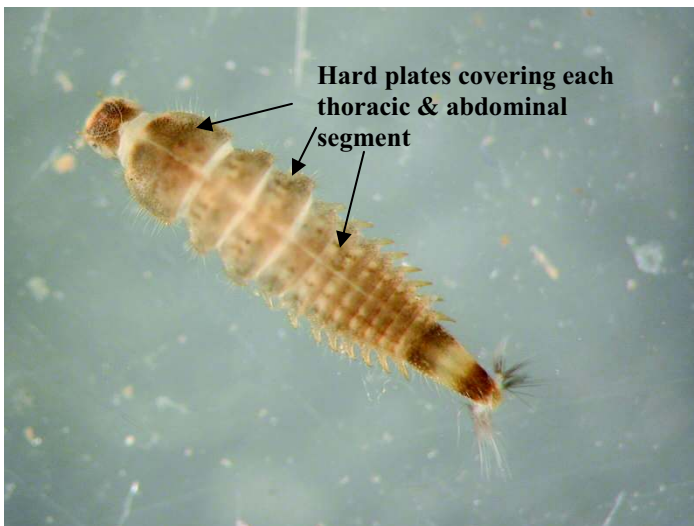




**Riffle Beetles (Adult)** – Have 3 pairs of long legs, slender antennae, and walk slowly under water.



**Riffle Beetles (Larva)** – Have 3 pairs of legs terminating in a single claw. Thoracic and abdominal segments covered with hard plates.

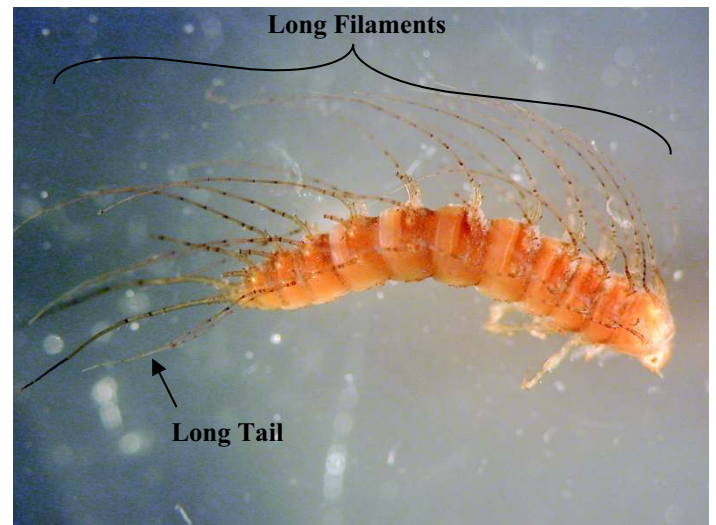


**Somewhat Pollution Tolerant**

**Crawling Water Beetles (Adult)** – Have long, slender antennae, swimming hairs on 3 pairs of legs, and is often patterned or spotted.



**Crawling Water Beetles (Larva)** – Has 3 pairs of legs each ending in hook-like claws, one long tail, and sometimes with long thin filaments extending dorsally from each thoracic and abdominal segment.



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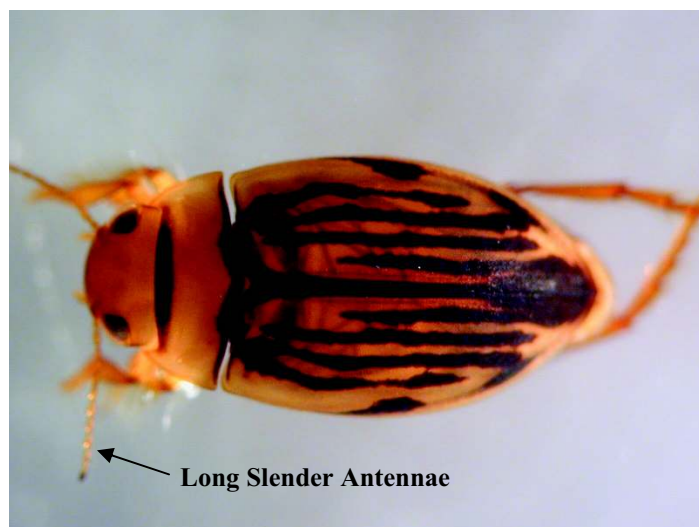
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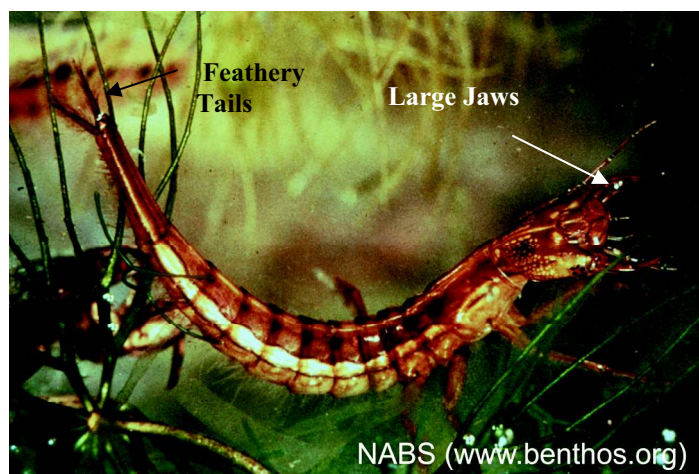
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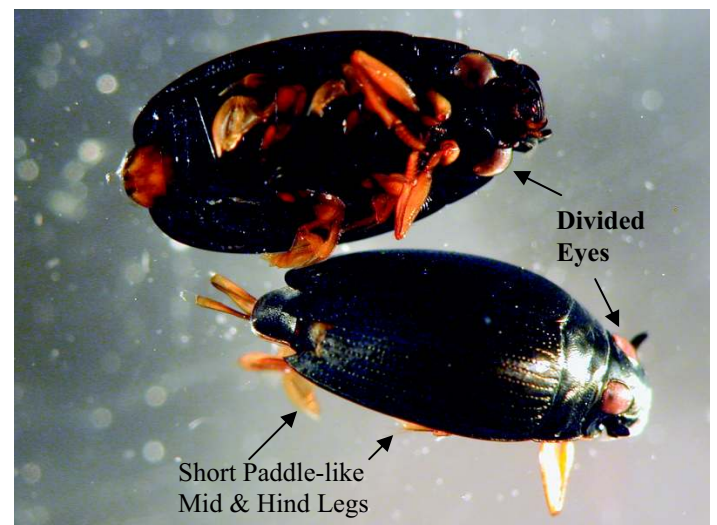
**Predaceous Diving Beetles (Adult)** – Oval streamline body, antennae longer than those of the Whirligig Beetle and slender.



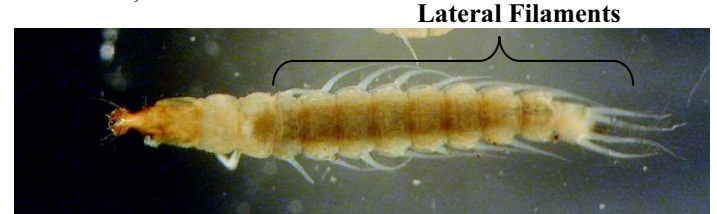
**Predaceous Diving Beetles (Larva)** – Have many hairs on body (sometimes very short), two feathery tails, and a large head and jaws.



**Whirligig Beetles (Adult)** – Have an oval body, short clubbed antennae, and mid and hind legs that are short and paddle-like. They have compound eyes that are divided so that it appears that they have eyes on the top and bottom of their bodies. They are erratic swimmers on the waters surface.



**Whirligig Beetles (Larva)** – Have 3 pairs of clawed legs, 10 abdominal segments with lateral filaments, and a short tail or no tail.

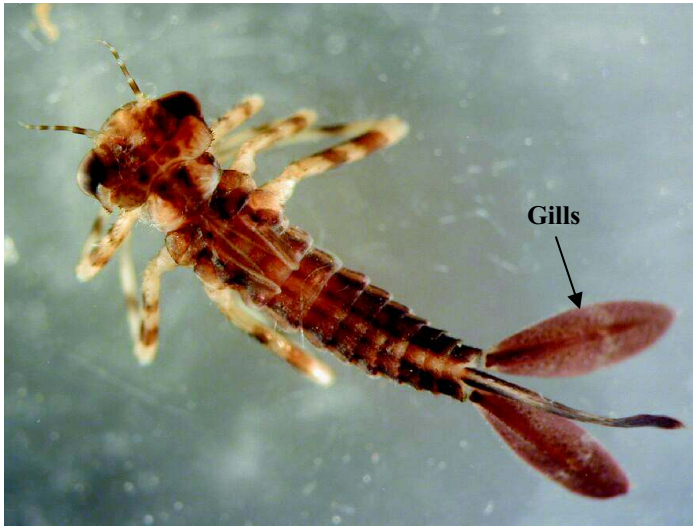


**Crane Flies** – Have a caterpillar-like segmented body with 4 finger-like lobes at the posterior of the abdomen and a head retracted into the body.

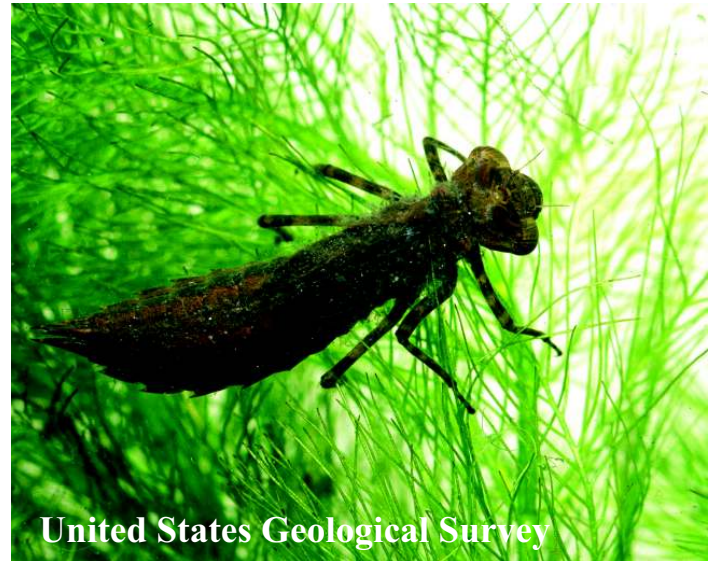




**Damselflies** – Are more slender than dragonflies. They have 3 pairs of thin hooked legs, large eyes, and 3 broad oar-shaped “tails” (gills). Their lower lip forms an extendable mask-like or scoop-like feature that is used to catch prey.



**Dragonflies** – Have a wide oval abdomen, 3 pairs of hooked legs, and large eyes. Their lower lip forms an extendable mask-like or scoop-like feature that is used to catch prey. Dragonflies swim by taking in water with their mouths and shooting it out their anus (Jet-propulsion!)



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**Damselflies & Dragonflies lower lip:**



**Spoon-shaped lower lip**

**Mask-like lower lip**

Photos: California Dept. of Fish & Game Aquatic Bioassessment Lab



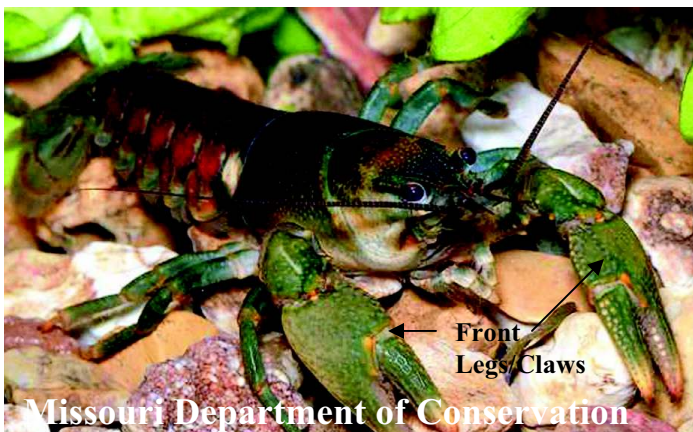
**Backswimmers** – Have forelegs that are not as spoon-shaped as the Water Boatmen and a v-shaped body. The backswimmer swims upside down so that when it comes to a stop its legs will be pointing up.



**Water Boatman** – Their forelegs are spoon-shaped and shorter compared to the backswimmer.



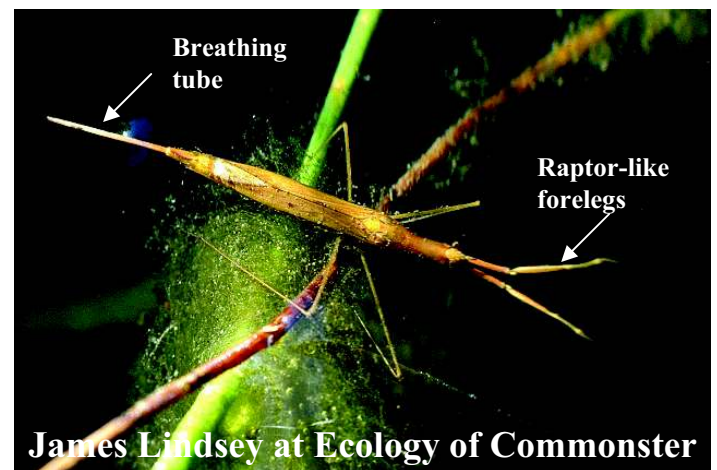
**Crayfish** - Look like small lobsters and have ten legs, with the front two bearing large claws, antennae, and an exoskeleton composed of chitin.



**Clams and mussels** – Fleshy body enclosed between 2 clamped shells. Do not count empty shells.



**Water Scorpions** – Raptor-like forelegs for catching prey, a long stick-like body and a long breathing tube extending from their abdomen.

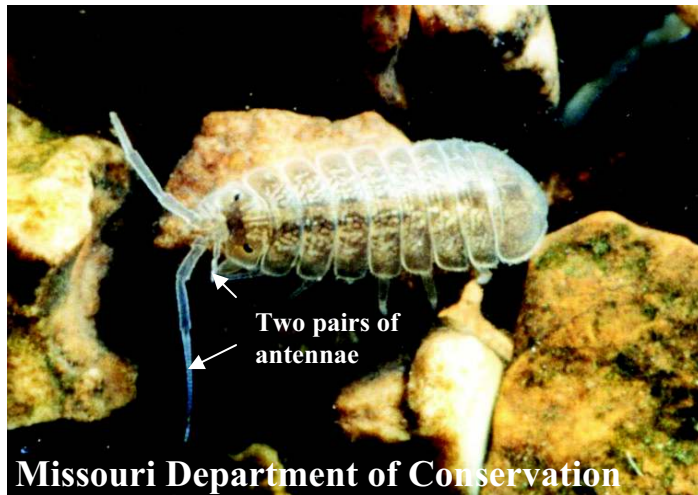


**Giant Water Bugs** – Oval body, raptor-like forelegs for catching prey, a beak shaped mouth and leathery textured wings that fold across the back.





**Sowbugs** - Look similar to scuds except they are dorso-ventrally flattened (body is wider than it is high) and gray to brown in color. They have seven pairs of legs, two pairs of antennae (one pair shorter than the other), and an exoskeleton composed of chitin.



**Scuds** - Laterally compressed (body is higher than it is wide), white to pale yellow in color, and are good swimmers. They are also called “freshwater shrimp” (although there is no relation); scuds will be on their sides if removed from the water because of their body shape. They have seven pairs of legs, two pairs of antennae of equal length, and an exoskeleton composed of chitin.



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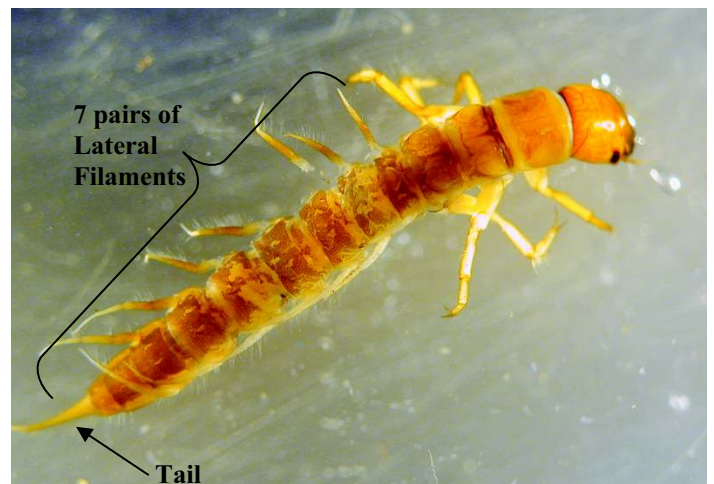
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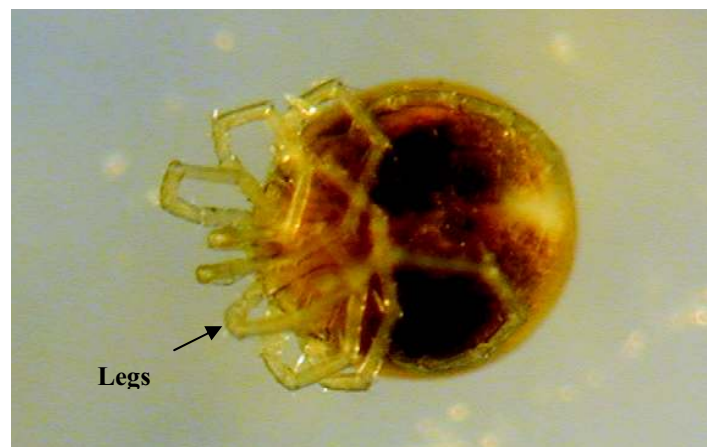
**Water Striders** - Have a slender body with long legs that allow them to “walk” on the water surface with a combination of surface tension, claws on their legs and an excreted wax.



**Alderflies** - Have 3 pairs of legs, 7 pairs of lateral filaments on abdomen and large forward projecting jaws. Looks like a small dobsonfly but has only one long tail filament.



**Water Mites** - Have 8 legs, no antenna, and a round one-segment body.







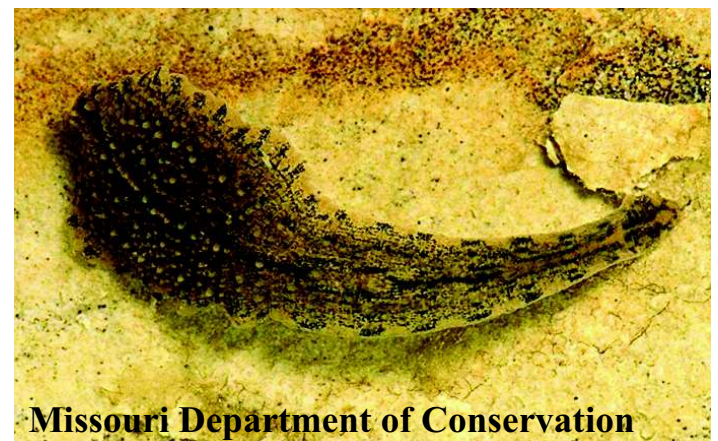
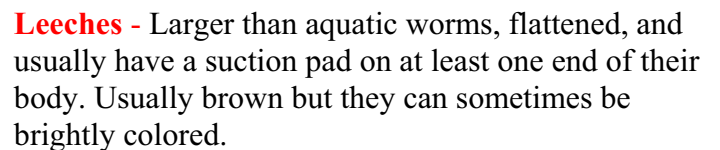
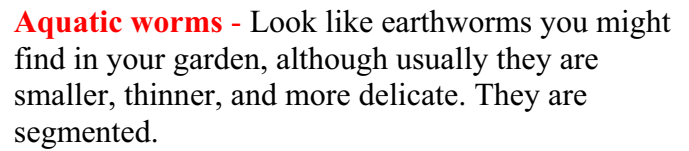
**California Dept. of Fish and Game  
Aquatic Bioassessment Lab**



**Missouri Department of Conservation**

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**Flatworms** - Small, flat, soft-bodied worms which often have a triangular or arrowhead-shaped head and visible eye spots.

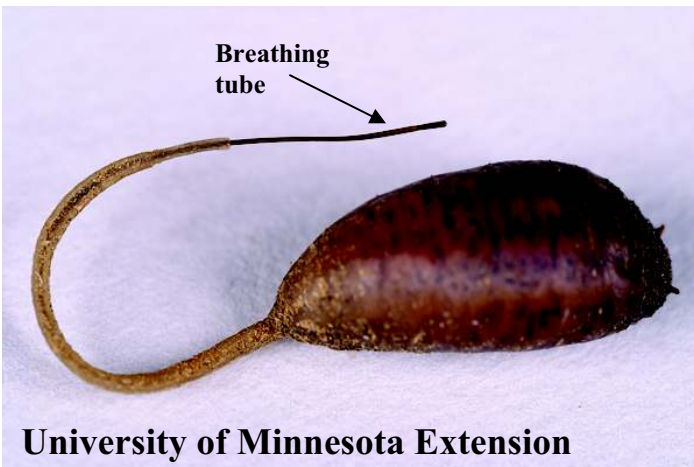




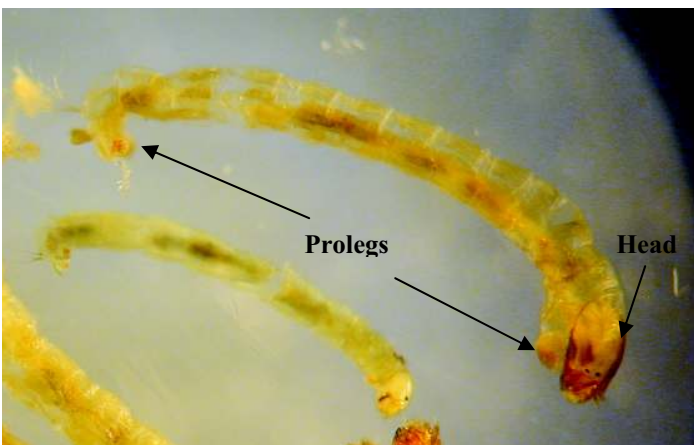
**Left spiral snails (pouch snail)** – Their opening spirals up from the left if you look at the shell with the tip pointed away from you.



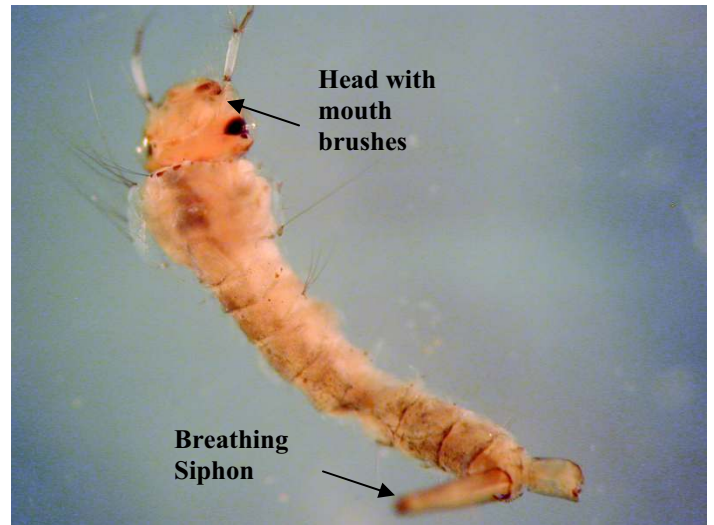
**Rat-Tailed Maggots** – Have a worm-like or grub-like body, semi-transparent skin, and a long breathing tube.



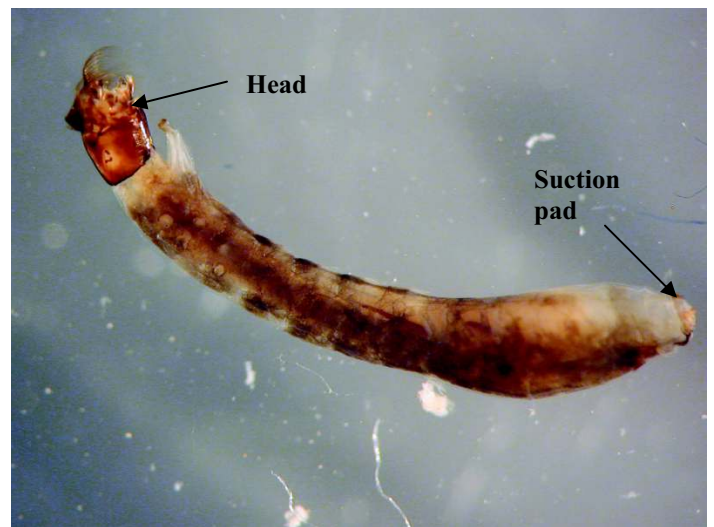
**Midge Flies** – Have small worm-like bodies, with a hard usually dark head and 2 small prolegs on each end.



**Mosquitoes** – Have a wide head with small mouth brushes and short antennae. Its abdomen has a breathing siphon at the end.



**Black Flies** – The posterior of the abdomen is wider than the rest of the body and has a suction pad. The head is small, hard, and black.



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**Non-streamlined Body**

A close-up photograph of a brown, textured beetle, likely a water penny larva or pupa, showing its non-streamlined, rounded body. The beetle is positioned diagonally, with its head towards the top right and its legs extended. The background is a dark, out-of-focus blue-grey, suggesting an aquatic environment. The text "Non-streamlined Body" is overlaid in the top left corner.

**Streamlined Body**

**Clubbed Antennae**

A close-up photograph of a stonefly nymph (amphipod) against a light blue background. The nymph has a segmented, brownish-yellow body and long, thin, light-colored legs. Its head is dark and features prominent, large mandibles. A black arrow points from the text 'Large Mandibles' to the mouthparts of the nymph.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.